Dynamic Network Formation: a Control-theoretic Perspective

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ABSTRACT: In this talk, I will explore a data-driven online optimization framework for the synthesis of certain classes of networks that are resistive to an external influence. The setup is built upon performance measures adopted in control theory, tailored for diffusion-type protocols evolving on networks. The approach provides means of embedding a distributed adaptive mechanism on networks that modify the way the network collectively responds to an external input. Along the way, we will explore connections between online distributed optimization, limits of influence on diffusion-type networks network controllability, electrical networks, and equation solving on graphs.

Bio: Mehran Mesbahi received his Ph.D. from USC in 1996. He was a member of the Guidance, Navigation, and Analysis group at Jet Propulsion Laboratory from 1996-2000 and an Assistant Professor of Aerospace Engineering and Mechanics at University of Minnesota from 2000-2002. He is currently a Professor of Aeronautics and Astronautics, Adjunct Professor of Mathematics, and Executive Director of the Joint Center for Aerospace Technology Innovation at the University of Washington in Seattle. He has co-authored the book Graph Theoretic Methods in Multiagent Networks (Princeton 2010) and is an Associate Editor for IEEE Transactions on Control of Network Systems. He was the recipient of NSF CAREER Award in 2001, NASA Space Act Award in 2004, UW Distinguished Teaching Award in 2005, and UW College of Engineering Innovator Award in 2008. His research interests are distributed and networked systems, systems and control theory, and engineering applications of optimization and combinatorics.